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SUMMARY OF THE INVENTION

The object of the present invention is to simplify the task of constructing electrical circuits in domestic, commercial and industrial buildings by providing a pre-wired connector block and self-locking junction box that is suitable for use in making wiring connections typically found in the routine installation of electrical services.

With the present invention, wiring connections are made without the cumbersome, tedious task of first threading the cable through the junction box holes. The present invention is self-locking and, as such, requires no screw, bolts, or cables to tighten in order to make secure connections. The possibility for electrical shocks and short circuits is eliminated. The self-locking junction box is secure and easily unlocked for additional wiring or removal of wires. The bare wire ends are safely contained within the junction box. Furthermore, the box can be easily recycled for other wiring jobs.

In accordance with one aspect of the present invention, there is provided a self-locking junction box comprising a first housing of non-conductive material, the first housing being comprised of a lower bottom part and an upper top part, the upper top part being suitably adapted in size to releasably engage the lower bottom part and self-lock thereto, and the first housing having a plurality of inlets arranged about itself to receivably engage electrical wires; a second housing of non-conductive material and having a plurality of

inlets and 3 layers of conductive material for establishing live, neutral and ground connections, respectively, which are connected thereto from the electrical wires to make a first electrical circuit, and the electrical wires are correspondingly disposed in relation to the plurality of inlets of the first housing, whereby, after the first electrical circuit has been made, the second housing is enclosed within the first housing; a third housing of non-conductive material housing a layer of conductive material with inlets at opposite ends to receivably engage the electrical wires to make a second electrical circuit, whereby, after the second electrical circuit has been made, the third housing is enclosed within the first housing; wherein the lower bottom part and the upper top part of the first housing are connected together to form the junction box having a closed top and a closed bottom; and a multi-pronged wire release tool, wherein a first end of the wire release tool is operably able to simultaneously disengage the connection of the live, neutral and ground connections in the first electrical circuit of the second housing and a second end of the wire release tool is operably able to disengage the second electrical circuit of the third housing, whereby, when any of the electrical wires in the first electrical circuit and the second electrical circuit require replacement or removal, the lower bottom part of the first housing is disengaged from the upper top part and the first end of the wire release tool is then used to simultaneously disengage the connection of the first electrical circuit of the second housing, and the second end of the wire release tool is used to disengage the second electrical circuit of the third housing and permit replacement or removal of any of the electrical wires in the first electrical circuit and the second electrical circuit without removal or displacement of the first housing.

In accordance with another aspect of the present invention, there is provided a self-locking junction box comprising a first housing of non-conductive material, the first housing being comprised of a lower bottom part and an upper top part, the upper top part being suitably adapted in size to releasably engage the lower bottom part and self-lock thereto, and the first housing having a plurality of inlets arranged about itself to receivably engage electrical wires; a second housing of non-conductive material which is enclosed within the first housing and having a plurality of inlets and 3 layers of conductive material for establishing live, neutral and ground connections, respectively, which are connected thereto from the electrical wires to make an electrical circuit, the electrical wires being correspondingly disposed in relation to the plurality of inlets of the first housing, whereby, after the electrical circuit has been made, the second housing is enclosed within the first housing, and the lower bottom part and the upper top part of the first housing are connected together to form the junction box having a closed top and a closed bottom; and a multi-pronged wire release tool wherein the wire release tool is operably able to simultaneously disengage the connection of the live, neutral and ground connections in the electrical circuit of the second housing, whereby, when any of the electrical wires in the electrical circuit require replacement or removal, the lower bottom part of the first housing is disengaged from the upper top part and the wire release tool is then used to simultaneously disengage the connection of the live, neutral and ground connections in the electrical circuit of the second housing, and permit replacement or removal of any of the electrical wires in the electrical circuit without removal or

displacement of the first housing.

A further aspect of the present invention provides a self-locking junction box comprising a first housing of non-conductive material, the first housing being comprised of a lower bottom part and an upper top part, the upper top part being suitably adapted in size to releasably engage the lower bottom part and self-lock thereto, and the first housing having a plurality of inlets arranged about itself to receivably engage electrical wires; a second housing of non-conductive material and having a plurality of inlets and 3 layers of conductive material for establishing live, neutral and ground connections, respectively, which are connected thereto from the electrical wires to make a first electrical circuit, wherein the 3 layers of conductive material in the second housing are stacked upon and insulated from one another and the electrical wires are correspondingly disposed in relation to the plurality of inlets of the first housing, whereby, after the first electrical circuit has been made, the second housing is enclosed within the first housing; a third housing of non-conductive material housing a layer of conductive material with inlets at opposite ends to receivably engage the electrical wires to make a second electrical circuit, whereby, after the second electrical circuit has been made, the third housing is enclosed within the first housing; wherein the lower bottom part and the upper top part of the first housing are connected together to form the junction box having a closed top and a closed bottom; and a multi-pronged wire release tool, wherein a first end of the wire release tool is operably able to simultaneously disengage the connection of the live, neutral and ground connections in the first electrical circuit of the second housing and a second end

of the wire release tool is operably able to disengage the second electrical circuit of the third housing, whereby, when any of the electrical wires in the first electrical circuit and the second electrical circuit require replacement or removal, the lower bottom part of the first housing is disengaged from the upper top part and the first end of the wire release tool is then used to simultaneously disengage the connection of the live, neutral and ground connections in the first electrical circuit of the second housing, and the second end of the wire release tool is used to disengage the second electrical circuit of the third housing and permit replacement or removal of any of the electrical wires in the first electrical circuit and the second electrical circuit without removal or displacement of the first housing.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a top view of the top part of an embodiment of the housing of the self-locking junction box;

Figure 2 illustrates a top view of the bottom part of an embodiment of the housing of the self-locking junction box;

Figure 3 illustrates a side view of the top part of an embodiment of the housing of a self-locking junction box;

Figure 4 illustrates a side view of the bottom part of an embodiment of the housing of a self-locking junction box;

Figure 5 illustrates a side view of the locked, two part housing of a self-locking junction box;

Figure 6 illustrates a cross-sectional view of the electrical cable inlet of an embodiment of the housing of a self-locking junction box;

Figure 7 illustrates a cross-sectional view of the self-locking device of an embodiment of the housing of a self-locking junction box;

Figure 8 illustrates a top, cross-sectional view of the box housing layers of conductive material in an embodiment of a connector block;

Figure 9 illustrates a side view of the box housing layers of conductive material in an embodiment of a connector block;

Figure 10A illustrates a top, cross-sectional view of the integrated spring lock connector of the box housing layers of conductive material in an embodiment of a connector block;

Figure 10B is a side view of the integrated spring lock connector of the box housing layers of conductive material in an embodiment of a connector block;

Figure 11 is a top view of the single wire connector in an embodiment of a connector block;

Figure 11A is a side, cross-sectional view of the single wire connector in an embodiment of a connector block;

Figure 12 is a front view of the special release tool;

Figure 12A is a top view of the special release tool; and

Figure 12B is an end view of the special release tool.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to Figure 1, an embodiment of the present invention is illustrated as the top part

10 of the self-locking junction box, said top part 10 being larger in diameter than the bottom part 20 of the self-locking junction box illustrated in Figure 2. Both the top part 10 and the bottom part 20 complement each other in such a way that when engaged, inlets 30a and 30b permit the securing and the passage of electrical cable. Holes 40 and 42 in the top part 10 and the bottom part 20 also, when aligned, permit the insertion of an attachment means, including a screwnail, to securely fasten the self-locking junction box to, for example, a stud, if the self-locking junction box is to support a fixture; otherwise, holes 44, 45, 46, and 47 in the bottom part 20 of the self-locking junction box, permit the insertion of an attachment means, including a screwnail, to securely fasten the self-locking junction box to a support surface (not shown). In a preferred embodiment, when the top part 10 and the bottom part 20 are aligned, a first housing is formed, and is of non-conductive material having, when connected together, a closed top and a closed bottom. As noted, the first housing comprises a lower bottom part 20 and an upper top part 10, wherein the upper top part 10 is suitably adapted in size to releasably engage the lower bottom part 20, and the first housing possesses a plurality of inlets (seen for example as reference numerals 30a, 30b in Figures 1 and 2) arranged about itself to receivably engage electrical cable (not shown). In one embodiment of the present invention, a second box housing (not shown) of non-conductive material having a plurality of inlets and 3 layers of conductive material for live, neutral and ground connections, respectively, is inserted into the first housing. In a preferred embodiment, each of these layers are insulated from one another.

The second box housing (or Terminal Connector Block) is housed by the first housing and each of the live, neutral and ground conductive layers are disposed in relation to the inlets 30a, 30b, of the first housing to securely receive the live, neutral and ground electrical cables to make an electrical circuit. In this manner, wires or cables are connected to the second housing (or Terminal Connector Block) prior to placement in the first housing of the self-locking junction box, the wires or cables are then placed in the inlets 30a, 30b, of the first housing, and, as the upper top part 10 and the lower bottom part 20 are connected together, the wires or cables are locked in place.

In an alternative embodiment, a third box housing (not shown), or single wire connector, of non-conductive material housing a layer of conductive material with inlets at opposite ends to receivably engage the electrical cable to make an electrical circuit can also be inserted into the first housing.

In a preferred embodiment of the present invention, the second box housing (or Terminal Connector Block) possesses a plurality of holes passing therethrough, each of which are operably able to receive a three pronged insulated wire release tool to releasably disengage said spring lock connectors to permit disengaging of the electrical cables.

In a further embodiment of the present invention, a grommet (not shown) of non-conductive material with at least two holes passing therethrough is affixed to an upper surface of the upper top part 10 of the first housing to receive electrical cables from, for

example, a fixture.

Referring to Figure 3, an embodiment of the present invention is illustrated as the side view of the top part of the self-locking junction box 10. When the top part 10 of the self-locking junction box is properly aligned with the lower part 20 of the self-locking junction box, a barb 50 in the lower part of the self-locking junction is ready to engage with a barb hole 60 in the upper part 10 of the self-locking junction box, as shown in Figure 4. Figure 5 illustrates the top part 10 and the bottom part 20 of the self-locking junction box in the engaged position with the lower part 20 of the self-locking junction box such that the barb 50 is secure with the barb hole 60. Referring to Figure 1, holes 32 and 34 in the top part 10 of the self-locking junction box are proximate to each barb hole 60 and permit the insertion of means for disengaging the barb 50 from each barb hole 60.

Referring to Figure 6, an embodiment of the present invention is illustrated as the cable inlet 70 to permit the secure passage of electrical cable through the self-locking junction box in the engaged position.

Referring to Figure 7, an embodiment of the present invention is illustrated as the barb 50 of the bottom part of the self-locking junction box engaging the barb hole 60 of the top part of the self locking junction box.

Referring to Figure 8, an embodiment of the present invention is illustrated as the pre-

wired terminal connector 80 showing wire inlets 90 to receive the bare end of electrical wire for contact against the spring lock connector 100, an integral component of the conductive layer 110.

Referring to Figure 9, an embodiment of the present invention is illustrated as the pre-wired terminal connector showing the three conductive layers 110, 112, 114, from top to bottom, as live, neutral and ground, with circular wire inlets 90 to receive the bare wire end. Rectangular holes 120, 122, 124 adjacent to each wire inlet are adapted to receive the ends of the wire release tool, as shown in Figure 12, such that, when the wire release tool is inserted, release the spring lock connector 100 and permit the release of the bare wire end.

Referring to Figure 10a, an embodiment of the present invention is illustrated as the bare wire end 130 to be inserted into the spring lock connector 100. Referring to Figure 10b, an embodiment of the present invention is illustrated as an end view of the spring lock connector 100.

Referring to Figure 11, an embodiment of the present invention is illustrated as the single wire connector 140 (or third housing) for housing in the self locking junction box. Figure 11a shows a circular wire inlet 90 to receive the bare wire end. As shown in Figure 11a, a rectangular hole adjacent to the wire inlet is adapted to receive the end of the single prong wire release tool 160 shown in Figure 12b. The present invention is thus, in the

preferred embodiment, a junction box having a first housing which houses a second and third housing which are each separately used to effect wiring connections therein, with the second housing being used to effect wiring connections for live, neutral and ground wires (in the three conductive layers 110, 112, 114 as noted above), and the third housing being used to effect wiring connections for a single wire connector, for example, a wire not requiring power (running wires to switches).

Referring to Figure 12, an embodiment of the present invention is illustrated as an end view of the three pronged wire release tool 150. The wire release tool, as shown in Figure 12a, is to be inserted into the three rectangular holes 120, 122, 124 of the second housing (or Terminal Connector Block) shown in Figure 9. Figure 12b shows an end view of single pronged wire release tool 160 for insertion into the rectangular hole of the single wire connector 140, or third housing, as shown in Figure 11a. Accordingly, wires or cables that have been inserted in the second housing (or Terminal Connector Block) or single wire connector 140 (the third housing) may be easily changed or removed by disengagement of the upper and lower portions of the first housing, and then subsequent insertion of the wire release tool, which will release the spring lock connectors 100 and permit the release of the bare wire ends. In operation, the multi-pronged wire release tool 150 is thus operably able to simultaneously quickly disengage the wiring connections in the second housing (or Terminal Connector Block) and, when the multi-pronged release tool 150 is flipped around, also disengage the single wire connector 140 , whereby quick removal or replacement of wires can be effected without the use of tools or screws, bolts or nuts.